



Forest Site Management Section

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SILVICULTURE NOTE 14

PROGRESS REPORT

Sx TRIAL 90-111-Q

FERTILIZATION OF INTERIOR SPRUCE (Sx) AT THE TIME OF PLANTING ENGLAND CREEK, FOUR-YEAR RESULTS

Introduction

Fertilization at the time of planting (FAP) has, in many parts of the province, become a routinely prescribed regeneration practice. It is prescribed to deal with a wide variety of perceived limitations to seedling establishment, including general planting check. This trial examines the effect of FAP on two different Sx stock types.

Sites

The England Creek test site is located along the Willow River east of Prince George (Figure 1). The site is in the Prince George Forest District in the willow variant of the moist, cool Sub-Boreal Spruce biogeoclimatic zone (Table 1). There are two blocks involved in this trial. Although the blocks share the same site series, they differ in elevation with the second block being exposed to increased cold air ponding and thus increased frequency of frost.



FIGURE 1. Location of England Creek FAP trial.



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TABLE 1. Site conditions for England Creek FAP trial

Site conditions and history	
Biogeoclimatic zone	SBSwk1
Site series	(07) Sxw-Twinberry-Oak fern
Moisture/Nutrient regime	4/C-D
Logged	1988
Site preparation	Broadcast burned 1989
Planted	1991

Species and Stock Type

The trial compares two stock types of the same seedlot of white spruce. Both stock types were spring-planted (Table 2). Stock type size, particularly on brush-prone sites, may be a more cost-effective regeneration strategy than FAP. At planting, the 2+0 stock type was about 8 cm taller than the 1+0 stock type.

TABLE 2. Sx stock types used at England Creek FAP/stock type trial

Species	Seedlot	Stock type	Height at planting
Sx	4177	PSB 313B 1+0	18 cm
Sx	4177	PSB 313B 2+0	26 cm

Treatments

There was only one FAP treatment used at England Creek (Table 3). FAP was prescribed as a possible means to avoid planting check and boost initial growth to avoid the brush competition expected on the site.

TABLE 3. FAP treatments used at England Creek FAP/stock type trial

Treatment	Formulation	Duration (month)	Fertilizer rate (g/tree)	N rate (g N/tree)
Control				
GROMAX #3™	17-7-12 (2 packs)	24	14.0	2.38

The rate of N applied is considerably less than that normally prescribed as a broadcast, surface application. GROMAX #3™ is an ammonia-rich N-source that releases its contents by rupturing rather than dissolving. Unlike some other GROMAX™ formulations, GROMAX #3™ does not include a hydrophilic gel to improve soil moisture. The duration of the fertilizer release is rated as 24-months for a specific combination of soil moisture and temperature. The expected duration of release is determined under laboratory conditions for specific temperatures and moisture content. Given the cooler soil temperatures and site conditions, it is possible that the fertilizer may last longer on the site than under the standard release conditions quoted by the manufacturer.

Results

Regardless of stock type, FAP did not effect planting check on either site. The total height growth in the first two years was less than 10 cm.

Survival

There were no statistically significant differences in survival between FAP treatments and the unfertilized seedlings at either site (Figure 2). There were however significant differences in survival between the two sites due to frost. Although frost damage was noted, there was no systematic assessment made to discriminate differences in the damage sustained between fertilized seedlings and those that were not fertilized. Frost damage appeared to affect both stock types and FAP treatments equally at the second site.

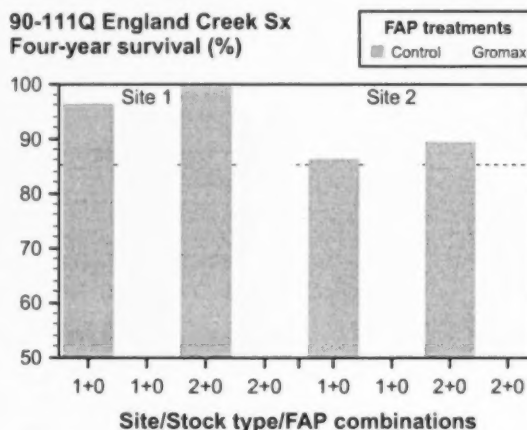
90-111Q England Creek Sx
Four-year survival (%)

FIGURE 2. Four-year survival of FAP/stock type treatment combinations at England Creek trial. The horizontal line at 85% is a reference line of silviculturally acceptable survival.

Height Growth

There were statistically significant differences between the growth of seedlings on the two sites but there were no differences between the FAP treatments and controls (Figure 3). There was a 20 cm height difference between sites. The fertilized seedlings were more variable than the matching unfertilized controls for the same stock type, possibly due to inconsistencies in the placement of the fertilizer. There is also a tendency for the larger 2+0 stock type at the second site to be slightly larger than the 1+0 after four years—however this effect is not present at the first site. The smaller size of the trees at Site 2 is due to repeated frost damage during the first two years of growth. The slightly better growth of the 2+0 stock type may indicate a better stress resistance of this stock type to frost.

Conclusions and Recommendations

FAP was of no benefit in alleviating planting check or improving survival and growth at either site. There are no further height growth differences expected. The trial will be assessed in 1996 to determine the effect of FAP on free growing.

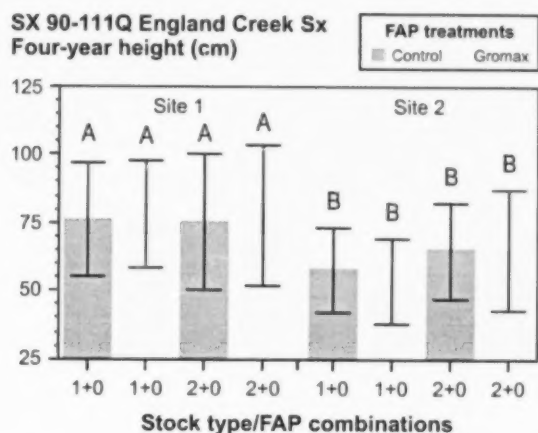


FIGURE 3. Fourth-year total growth and standard error of the mean for different FAP/stock type combinations at England Creek trial. Treatment means marked with the same letter are not considered statistically significantly different at a probability of 5%. The error bar about the mean four-year height is the standard error of the mean.

